

Algebra: Laws of Exponents

N

Practice Worksheet • numberbender.com

Name: _____ Date: _____ Score: _____

DIRECTIONS

Simplify each expression using the Laws of Exponents. Write your answer with positive exponents only.

1 Simplify (Product Rule):

$$x^3 \cdot x^5$$

Answer: _____

2 Simplify (Product Rule):

$$2^3 \cdot 2^4$$

Answer: _____

3 Simplify (Quotient Rule):

$$x^7 / x^2$$

Answer: _____

4 Simplify (Quotient Rule):

$$5^6 / 5^3$$

Answer: _____

5 Simplify (Power Rule):

$$(x^4)^3$$

Answer: _____

6 Simplify (Power Rule):

$$(2x^3)^4$$

Answer: _____

7 Simplify (Zero Exp.):

$$7x^0$$

Answer: _____

8 Simplify (Neg. Exp.):

$$x^{-3}$$

Answer: _____

9 Simplify (Neg. Exp.):

$$3x^{-2} y^4$$

Answer: _____

10 Simplify (Mixed):

$$\frac{(x^2 y^3)^2}{(xy)^3}$$

Answer: _____

Answer Key & Solutions

Algebra: Laws of Exponents • Numberbender

N

TEACHER NOTES

Product rule: add exponents. Quotient rule: subtract. Power rule: multiply. Zero exponent = 1. Negative exponent = recip

rocal.

$$\begin{aligned} 1 \quad x^3 \cdot x^5 \\ = x^8 \end{aligned}$$

Add exponents: $3+5=8$

$$\begin{aligned} 2 \quad 2^3 \cdot 2^4 \\ = 128 \end{aligned}$$

$2^{(3+4)} = 2^7 = 128$

$$\begin{aligned} 3 \quad x^7 / x^2 \\ = x^5 \end{aligned}$$

Subtract exponents: $7-2=5$

$$\begin{aligned} 4 \quad 5^6 / 5^3 \\ = 125 \end{aligned}$$

$5^{(6-3)} = 5^3 = 125$

$$\begin{aligned} 5 \quad (x^4)^3 \\ = x^{12} \end{aligned}$$

Multiply exponents: $4 \times 3 = 12$

$$\begin{aligned} 6 \quad (2x^3)^4 \\ = 16x^{12} \end{aligned}$$

$2^4=16$, $(x^3)^4=x^{12}$

$$\begin{aligned} 7 \quad 7x^0 \\ = 7 \end{aligned}$$

$x^0 = 1$, so $7 \cdot 1 = 7$

$$\begin{aligned} 8 \quad x^{-3} \\ = 1/x^3 \end{aligned}$$

Negative exp = reciprocal: $1/x^3$

$$\begin{aligned} 9 \quad 3x^{-2}y^4 \\ = 3y^4 / x^2 \end{aligned}$$

Move x^{-2} to denominator: $3y^4/x^2$

$$\begin{aligned} 10 \quad (x^2 y^3)^2 / (xy)^3 \\ = x y^3 \end{aligned}$$

Num: $x^4 y^6$; Den: $x^3 y^3 \rightarrow x^1 y^3$